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*USAID Mission to Mongolia,
Economic Policy Support Project,
Power and Heat Sector Reform*

***Commercialization
Initiatives at Darkhan-
Selenge Electric
Distribution Network
Volume 1 Report***

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1 Executive Summary

This project is part of the overall USAID EPSP Energy Reform Program designed to promote the restructuring, commercialization and privatization of the energy sector.

The 18 new energy companies formed in Mongolia as a result of restructuring were reviewed by PA Consulting, and selection of representative electric generation, distribution, integrated system and heat distribution companies coordinated with the State Property Committee, Ministry of Infrastructure as well as USAID. The selected companies were the focus of the commercialization work and included: UB Power Plant 4, Darkhan-Selenge Electric Distribution Network, the Eastern Electric System, and UB Heat Distribution Network.

The project recommendations of the steps necessary to promote commercialization of the company included:

- Financial review;
- Organization and staffing;
- Technical performance;
- Billing and collections;
- Management Information Systems review, and
- Best Business Practices

This report gives results of the commercialization work done at Darkhan-Selenge Electric Distribution Network (DSEDN).

Additional time was spent to prepare and give several presentations to management, including:

- *Commercialization Overview*
- *Financial Decision Making*;
- *An Introduction to Bill Frequency Analysis* with a presentation of preliminary results;
- *Business Plan Development* with a focus on Financial Planning, and
- *Introduction to Proforma Financial Analysis*
- *Draft Commercialization Report Presentation*

There was very good cooperation of the management of DSEDN during this study, and during the course of the project improvements in identified areas have been made.

Key Findings

Management and Reporting

There is a severe issue of the same government entities represented on the Board of Directors also having controlling interest in large customers of DSEDN. As a result DSEDN receives mandates to continue supply of electricity to non-paying customers.

The organizational structure of the company needs to be based on clearer financial accountability and managerial responsibility relationships.

Scheduled performance-based reviews of employees, particularly at the management level should be implemented. Any incentive based compensation system must be clearly communicated to all employees.

Standard reporting formats and the scheduling of the reporting at least on a monthly basis between the various divisions and head offices should be implemented. These reports should be standardized in an electronic format for incorporation into an entire company report. These reports should include:

- *Detailed cost data and performance to budget*
- *Customer information, including connections and disconnections*
- *Billing details by customer, region, and bill writer*
- *Collections by customer and customer type*
- *Receivables information*

The implementation of Executive order number 43 on 27 March 2002 significantly improved the quality and frequency of reports (See Appendix 12). What is necessary is to improve MIS to make reporting easier, and to make clear summary reports that allow accurate and timely management decisions.

Business plans from each division should be created and updated on at least a quarterly basis by the management of that division, submitted to the head office and incorporated into the overall company business plan.

Technical and Commercial Losses

Technical and commercial losses for the company are not accurately measured due to inaccurate metering and poor data collection. Losses are projected to be 26.4% for 2002, and 19.5% for 2003. Improvements to an overall level of 8% are possible according to the Energy Regulatory Authority. This low level of losses is only obtainable with substantial investment and monitoring procedures over an extended time period.

Reported data indicate large fluctuations in these losses over the last five years. This inaccuracy is probably due to inaccurate measurements as well as technical inefficiencies issues in the system. Investment in equipment necessary to decrease losses has a very high financial rate of return. Particularly high losses are due to improper transformer size. DSEDN has plans to invest in new lines, meters and transformers to address these losses.

Solving commercial losses from illegal connections will require a high degree of cooperation with the local authorities and increase in the amount of monitoring in the problem areas. The installation of secure meter boxes has shown substantial improvements in lowering commercial losses.

Billing and Collections

The issue of receivables from customers is a continuing problem with total receivables as of the end of June approaching 4 billion Tg. A substantial

portion of these receivables (about 40%) is attributed to five GOM corporation customers. Several of these customers are at least a year in arrears. The company needs to continue focussing on recovering these receivables from the biggest debtors, which will require coordination of the State Property Committee and the Ministry of Infrastructure.

About 25% of the residential customers either do not have meters or they are either broken or missing. Most of these are ger residents. Costs to replace all old mechanical meters with electronic meters is estimated to cost 640 million Tg for residential customers, 980 million Tg for industrial customers, and 105 million Tg for high voltage industrial customers. DSEDN must begin scheduled replacement of meters as the Energy Law requires distribution companies to replace customer owned meters with meters owned by the distribution company. It is important for all customer meters to be owned, calibrated and maintained by the distribution company.

The existing billing system does not track past due amounts on the bill given to the customer by the bill writer, and penalties for non-payment of past due accounts are not consistently specified and enforced for all customers. To encourage payment of past due accounts, penalties need to be calculated, amounts indicated on the bills, and collections enforced.

The customer data base indicates that not all customers that owe money are consistently billed on a monthly basis. It appears that only those customers with usage during the month receive bills. It is important to bill all customers that owe money even if they do not presently have usage of electricity on a regularly scheduled and recurring basis. Consistent aging of accounts receivable should be improved.

Performance based salaries for the bill writers has been instituted, and shows initial success in increasing billing and collection percentages. Additional effort to collect past due amounts is being done by other employees on a commission basis and is proving successful.

The only real recourse for non-payment is disconnection. The effectiveness of disconnection requires that it is technically possible, enforceable and without political coercion. Procedures for disconnection should be enacted and strictly enforced.

If past due amounts are truly non-collectable, a system for writing them off as bad debt needs to be instituted and followed.

There is the potential for creation of a "Life Line" tariff in the region. Bill frequency analysis indicates that the establishment of this tariff would have minimum affect on the total income of DSEDN.

The present computerized financial and billing system was funded by ADB and installed in the late 1990's. This system has proven somewhat effective, but needs to be upgraded to allow more full integration between the general ledger and sub ledgers. Methods for transferring data electronically from

other divisions should be put in place. These computer systems have poor backup methods in place and audit of the information is low.

Creation of a Management Information Systems manager to develop plans and budgets to upgrade the existing systems and coordinate linking of data between divisions is recommended.

Section 10 of this report details the recommendations of this report along with implementation recommendations, responsibility for implementation, a timeline and preconditions. Results of implementing the recommendations are also given. The matrix below is a summary of the recommendations.

Funding of the recommendations remains a critical issue for the success of commercialization. Section 11 of the report gives possible sources of investment funds from such areas as donor agencies, grants, private sources, and concessionary funding.

Figure 1-1 Recommendation Matrix

Task	Precondition	Responsible	Timeline	Priority	Results
Restructuring of the Board of Directors	Amend Law if Required	SPC, Mol, MoF, Parliament	1H2003	Medium	Eliminate Conflict of Interest, Increase Management Efficiency
Restructuring of the Organizational Chart	Clarification of Executive Director Legal Requirements	Directors of DSEDN, Board of Directors	1Q2003	Medium	More efficient financial decision making
MIS Implementation	Hiring of MIS Manager, Obtain Funding	MIS Manager, DSEDN Management	4Q2004	High	Improved tracking of billing and collections. Improved financial reporting and data storage
Standardization of Reporting Formats to Upper Management	Upgraded MIS system, hiring of MIS Manager	Directors of DSEDN, MIS Manager	2Q2003	High	Better tracking of financial issues, improved management efficiency
Investment Decisions Based on Financial Return	Obtain investment funding	Board of Directors, Directors of DSEDN	Ongoing	High	Optimize utilization of limited investment funds
Creation of Focused Business Plan at Each Branch and at the District Level	New Organizational Structure and Reporting Formats	DSEDN Management at the branch and division level	1H2003 and ongoing	Medium	Create focus on profitability, optimize utilization of funds and plan for future requirements
Establish Scheduled Performance-Based Employee Reviews	Performance not based on issues out of the control of employees	Board of Directors, Managers of DSEDN	1Q2003	Medium	Reduction in staffing where possible, increased employee motivation
Lower Overall Technical Losses	Funding availability	Executive Director and Deputy Director (Technical)	4Q2005	High	Financial savings
Install Meters at all 0.4 kV Transformers	Funding availability	Executive Director and Deputy Director (Technical)	1H2003	High	Identify commercial losses
Limit Commercial Losses to an Acceptable Level	Change in law may be required	DSEDN Management, Bill Writers, Parliament	4Q2004	High	Financial savings
Recommendations for Implementation of Life-Line Tariffs	Tariff structured by ERA	ERA, DSEDN Management, possibly Parliament	1H2003	Low	Lower operational costs, societal impact
Improve Billing System	MIS staffing and equipment	Management at Division and at Branches	1H2003	High	Increased collections, improve audit ability of bill writers
Enforce Disconnection Policy	Political will, create policy and inform customers	Board of Directors and Management of DSEDN	1H2003	Medium	Improve collections
Collect Accounts Receivable from Entities	Bankrupt entities, political interference	Board of Directors, Director of DSEDN, SPC	4Q2003	High	Financial Impact, up to 2 Billion Tg
Collect Accounts Receivable from Budget Customers	Political will	Board of Directors, Director of DSEDN, SPC	2Q2003	High	Financial Impact, up to 260 Million Tg
Collect Accounts Receivable from Residential Customers	Staffing availability	Board of Directors, Director of DSEDN, SPC	4Q2003	High	Financial Impact, up to 750 Million Tg
Write off of Bad Debt	Change in law that required court approval	Director of DSEDN, Board of Directors, possibly SPC, Mol and MoF	4Q2003	Medium	Accurate representation of financial balance sheet

2 Introduction

The commercialization work at DSEDN is part of the overall USAID EPSP Energy Report Program to promote the restructuring, commercialization and privatization of the energy sector by:

- Restructuring the vertically integrated utility (EA) - unbundling into state corporations;
- Establishment of an energy regulatory agency;
- Setting up a licensing regime to ensure that commercial and regulatory commitments are honored and consumer protection is provided;
- Development of network operations and access rules;
- Development of cost-of-service-based tariffs to allow for recovery of costs and to provide for new investments in the future, including the deregulation of fuel prices and contract prices between eligible consumers and non-regulated suppliers;
- Development of a system of competition in generation and perhaps in retail (supply) if economically warranted;
- **COMMERCIALIZATION OF THE SECTOR ENTITIES AND PREPARATION FOR PRIVATIZATION**; and
- Privatization of the State owned commercialized companies with level and timing determined by Government policy.

PA Consulting reviewed the eighteen new companies formed as a result of the restructuring of the Mongolia Electric Sector. The selection of representative companies was coordinated with the State Property Committee, Ministry of Infrastructure as well as USAID. Representative companies from each of the particular areas of generation, distribution, integrated system, and heat distribution were chosen.

These companies included: UB Power Plant 4, Darkhan-Selenge Electric Distribution Network, the Eastern Electric System, and UB Heat Distribution Network. It is anticipated that recommendations for commercialization of these representative companies, can be applied to the other similar types of companies formed during the restructuring.

This report summarizes the results of commercialization efforts at Darkhan-Selenge Electric Distribution Network (DSEDN). The report is in two volumes, this volume I is the main body of the report and the Appendix forms volume II.

DSEDN supplies electricity to 33,652 residences and 2,219 entities in 27 different soums in the three Aimags of Darkhan-Uul, Selenge and Tov.

This work on commercialization was designed to assist the company with creating a plan to promote commercial based operations. Commercialization efforts need to be accomplished within the current context and operations of the company. The report recommendations of the steps necessary to achieve commercialization in the company included:

- Financial review;
- Organization and staffing;

- Technical performance;
- Billing and collections;
- Management Information Systems review, and
- Best Business Practices

Since time was limited for this work, major focus was given to selected issues at each of the chosen entities. It was requested by the director of DSEDN to give particular attention to the billing and collection processes.

Cooperation of the staff and management of DSEDN was excellent, and the project has been a participatory one involving several presentations to the management of DSEDN. These presentations are included as Appendix I and have included:

- *Commercialization Presentation* (given to all counterparts, including DSEDN);
- *Financial Decision Making*;
- *An Introduction to Bill Frequency Analysis* with a presentation of preliminary results;
- *Business Plan Development* with a focus on Financial Planning, and
- *Introduction to Proforma Financial Analysis*
- *Draft Commercialization Report Presentation*

Since this project started in January of this year, significant progress has been made by management to address major identified issues. It must be understood that changes are continually occurring, so this report and recommendations to achieve commercial operation are based on the current status of DSEDN.

3 Commercialization Overview

3.1 Financial Issues

Very simply stated, any commercially operated concern operates to achieve a profit, does not require funding from the Government, and is viable over the long-term. A company can operate short term at an overall loss, but will not be sustainable over the long haul without making a profit.

A fully commercialized enterprise has identified characteristics. These include full implementation of International Accounting Standards (IAS), internal audit controls and an annual audit by a recognized accounting firm. The enterprise also issues audited annual reports.

During day-to-day operations, the firm must accurately track actual costs on a detailed basis, pay expenses on a timely basis, and have a strategy for dealing with debt.

Over the long-term the company must operate with the goal of improving operational efficiency. As part of this planning for efficient operation the company should negotiate sales agreements with large users where possible. In order to maximize the use of limited capital resources, any investment plans are analyzed on a cost-benefit basis using a financial model.

Management of the business assets to maintain productivity is essential. This management includes proper scheduled maintenance with sources for investment capital in place, from either internal or external funds.

Creating and monitoring budgets for each department of the enterprise is important. These budgets should include sales, production, materials, labor, manufacturing, and administration costs. Defined budgets are tracked and deviation from budgets identified and described on a monthly and year to date basis.

3.2 Organizational and Staffing

For commercial operation it is important to have an organizational structure that facilitates a focus on profitability and increasing operational efficiency. Within that structure reporting systems are in place to allow management to make decisions based on receiving accurate and timely information.

Maintaining quality staff requires implementation of motivational techniques that include regular performance reviews and a bonus structure that rewards superior performance. Training staff to improve their work and position within the company is also vital.

3.3 Billing and Collections

High quality customer service includes the supply of consistent, reliable electricity at a reasonable cost. An important part of customer service

includes providing information concerning issues affecting supply. Without quality service it is difficult to obtain prompt payment for these services.

Of critical importance to any commercially operated enterprise is the control of cash. Control of cash mandates an efficient billing and collections system. Billing must be done on a timely basis for every unit of energy sold and payment must be collected when due. Overdue accounts are aged accurately and penalties for late payment imposed.

Effective communication with the customer base is important so the customer understands what they owe and the ramifications if they do not pay. Effective recourse such as disconnection must be defined, explained to the customer and followed explicitly. Any commercial losses including theft of electricity must be identified and stopped at the earliest onset.

3.4 *Management Information Systems (MIS)*

Decisions are only as good as the information used to make those decisions. It is therefore very important to have Management Information Systems (MIS) in place to supply accurate information for decision-making, cost and asset management, management of human resources and project modeling.

With MIS in place, managerial reporting systems should be available that allows management to make decisions based on an articulated profit goal. These reports are used to plan for profit and to manage limited cash, including using working capital in an optimum manner.

In conjunction with MIS and management reporting systems, accurate forecasting of customer consumption and payments is important. Scheduling for required investments is part of the forecasting procedure.

4 Best Practices

There are external issues that affect a commercial enterprise, and particularly a regulated enterprise such as electrical distribution. The independent regulatory agency must first of all, be totally independent and separate from the ongoing commercial operation of the firm. This agency must be completely free of any possible political interference while establishing tariffs adequate for the financial survival of the entity. Any subsidies remaining in the sector must be clearly defined and transparent.

The legal structure in Mongolia should support the formation of commercial enterprises and allow for both foreign and local investment within a defined contractual framework. Legal recourse to recover past due accounts and laws to punish electricity thievery are important. At present the thievery of electricity in Mongolia is not a crime according to the Criminal Law enacted in 2002. This law needs to be amended and strictly enforced.

4.1 Benefits of Commercialization

Commercialization is a necessary and desirable goal. Benefits of commercialization include the potential:

- Of lowering costs with resultant lower wholesale and retail power prices to customers;
- Increasing reliability and efficiency, and in the process, benefit consumers of power;
- To instigate modern management techniques;
- Of lowering the costs of transactions and of regulation;
- For extending electricity supply to citizens not currently supplied with power;
- To increase training and education of the workforce;
- For helping to eliminate corruption and market-distorting practices including hidden subsidies;
- Greater economic growth in the distribution region, and
- To begin the de-politicizing of issues such as tariffs and disconnection policies.

Adopting and implementing best practices is a long-term effort that requires not only specific internal actions by DSEDN itself, but also supporting actions on the part of its customers, the Government of Mongolia, ownership entities, debtors, and investors. Mongolia is in the position of many countries where a significant portion of the power sector is owned by the government, and the potential benefit of private sector participation has not been obtained. It must be remembered that there can be political, psychological, financial, technical and other barriers to achieving a number of these “best practices”; but it remains that these practices are desirable and goals to strive for.

4.2 Government and Legislative Practices

To support commercialization at the distribution level it is necessary for the Government of Mongolia to:

- Establish an unequivocal government commitment and vision in favor of full commercial operation of companies within the power sector;
- Reconcile differences and clearly establish jurisdictions between federal and local/regional governments through a focused dialogue;
- Have an agreement between the federal government and the regional or municipal governments as to the goals, as these agencies may have competing agendas, and
- If subsidies are required, these subsidies must be transparent, fully understood, and equitable.
- In order to allow a more balanced Board of Directors, changes in the law may be required.

4.3 Regulatory and Legal Practices

To support overall commercialization it is important that the regulatory agency:

- Pass some efficiency gains to the consumer while maintaining the utility's incentives to increase efficiency;
- Establish clear regulatory rules and a process for setting tariffs;
- Reduce and remove subsidies and cross-subsidies for specific end-user groups to the greatest extent possible. Any required subsidies can be continued out of government revenues;
- If assistance is provided to specific customer groups, there should be an ongoing process in place to determine that customers need this assistance;
- Reduce theft and increase collections as much as possible through education and licensing procedures and legally ensure that the company can take action against violators;
- Performance standards and tariff mechanisms should not undergo frequent regulatory approval, to allow the company sufficient time to obtain the financial benefits of efficiency improvements, and
- Train staff to make sure that good skills for grid operation are in place at the central and regional levels.

4.4 Billing and Collections System

4.4.1 Measure accurately what is purchased

With the creation of DSEDN as a separate entity from transmission and separation of the divisions within DSEDN there remains some problems accurately measuring the amount of electricity supplied to the individual divisions. This is predominantly an issue related to inaccurate or inadequate meters. Investment in accurate meters and consistent reading of these meters is important, including purchase of electricity from the transmission

company as well as the “internal” allocation of power between districts. Calibration and maintenance of the meters must be maintained.

4.4.2 Identify and aggressively address technical losses

Technical losses at the various voltage levels are presently estimated using “standards”. In order to identify and separate commercial losses from actual technical losses, accurate metering must be in place. It is recommended to begin an effort to install these meters in a progressive manner. There are a total of 327 substations in the district, with a total of 192 meters in place. An additional 186 meters are required.

4.4.3 Monitor commercial losses and limit them

Commercial losses (including thievery) are currently difficult to monitor and sometimes more difficult to stop. At the residential or 0.4 kV level, meters at each of the substations would allow comparison of electricity delivered to an area to the amounts billed in that area. With this information it would be easier to identify the sources of stolen electricity and address these sources. A major source of commercial losses is probably inaccurate customer meters. It is a part of the Law on Energy that the Distribution Company owns the meters and DSEDN should begin a program and schedule to replace all customer owned meters with new meters owned by the company. With the installation of the meters mentioned in section 4.4.2, it will be possible to accurately measure commercial losses by bill writer region. With accurate meter reading at the consumers, it will be possible to identify and solate commercial losses.

4.4.4 Bill for every KWhr delivered

Consistent billing for every kWhr delivered either metered or estimated is important. If billing of the small customers is not possible on a monthly basis, establishing a consistent estimate of consumption can be done.

4.4.5 Collect on a timely basis for every KWhr billed

Aggressive collecting procedures including penalties and disconnection for non-payment must be instituted. Communication of these procedures with the customers and consistent implementation of the procedures need to be done. Collection at many of the state-owned entities will require commitment at all levels of government. A clear policy on disconnect and re-connection procedures needs to be developed. All consumers need to be made aware of this policy and the policy must be consistently enforced. .

5 Structure of DSEDN- Findings and Recommendations

5.1 Ownership and Board of Directors:

The Board of Directors for DSEDN is actually a Board of Shareholders, as the members of the Board are all government employees. Board meetings are usually held in Ulaan Baatar. The breakdown of ownership for DSEDN is as follows:

- 41% is owned by the Ministry of Infrastructure;
- 39% is controlled by the State Property Committee, and
- 20% by the Ministry of Finance.

5.2 Members of the Board of Directors

Members of the Board of Directors of the Darkhan Selenge EDN are shown in the table below.

Table 5-1 Members of the Board of Directors

Name		Profession	Organization
Orsoo OLZIIKHISHIG	Chairman	Electrical engineer	Energy Authority General Measuring Inspector
Shagdar SONOMDAGVA	Member	Construction engineer	Ministry of Infrastructure Head of the State Administration & Management Department
Sharav BATRECHIN	Member	Thermal automatic engineer	Ministry of Infrastructure Specialist
Buyanzaya ERDENEBILEG	Member	Electrical engineer	Energy Authority Head of the Department of Foreign Affairs
Myadag GANKHUYAG	Member	Mining engineer	State Property Committee
Dairijav DULAMSUREN	Member	Economist	State Property Committee
Dambachultem BAILIKHUU	Member	Economist	State Property Committee Advisor to the chairman of the State Property Committee
Myagmarsuren BATGEREL	Member	Economist	Ministry of Finance and Economy

In the short term prior to privatization, this kind of government control is common; particularly in the energy sector. However, several problems are encountered with this type of Board of Directors, of which shareholders predominate. Primary to this is severe conflict of interest. Many of the entities to which DSEDN supply electricity are also owned by the government agencies represented on the board. As a result, DSEDN often received mandates from a government agency stopping them from disconnecting customers for non-payment. This is a severe obstacle to creating DSEDN as a commercial enterprise.

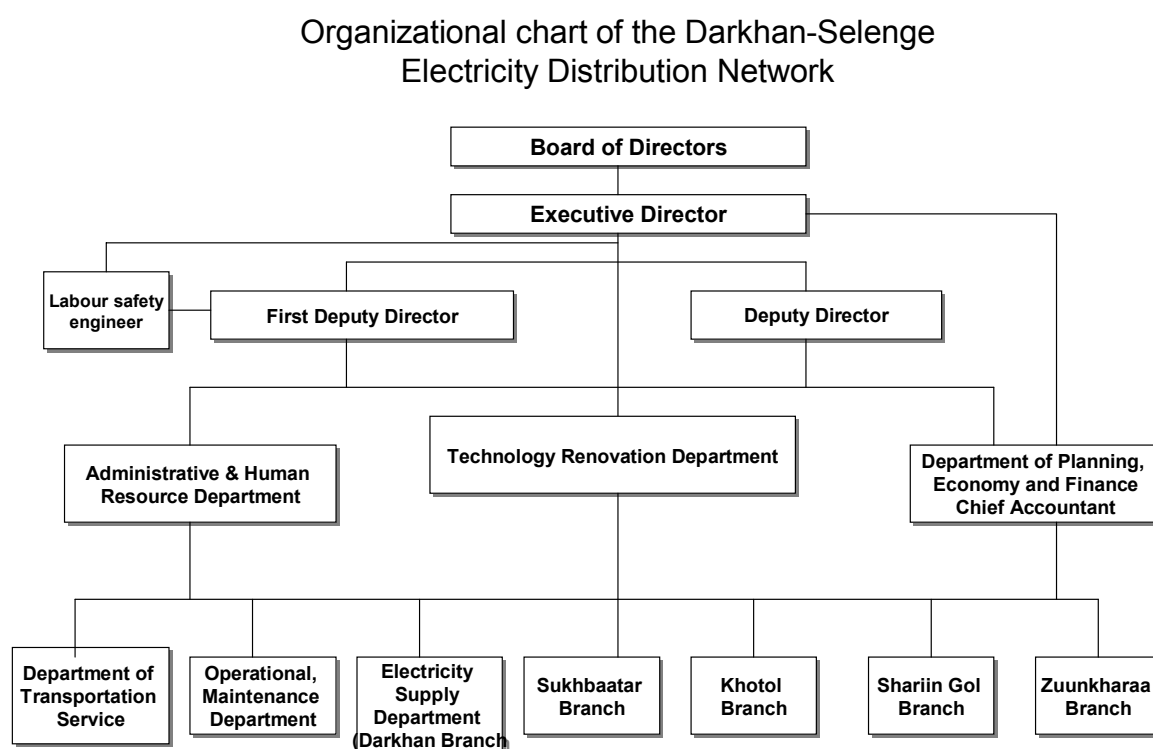
This type of interlocking directorships must be phased out, allowing true independent commercial operation of the restructured energy sector. The Executive Director of the company should be a member of the Board of Directors.

5.3 Organizational Chart

There has been some confusion on the actual organizational chart now in place. Any new organizational chart should indicate the increasing importance in the enterprise for financial decision-making and other issues. There remains a problem with having the individual division reporting responsibilities so “low in the chart”. The exact reporting of the divisions is not clear.

The present Organizational Chart as received is shown in Figure 5-1. A simplified recommended Organization Chart is also given as Figure 10-1. It is important to give some decision authority to Managers and allowing the Executive Director to operate at an efficient level. The dashed line between “Technology Renovation” indicates sales and collections reporting that should be given to the Deputy Director Financial.

Figure 5-1 Present Organizational Chart



1

The Organizational Chart needs to indicate clearer financial accountability and managerial responsibility.

It is recommended to place financial responsibility for all divisions under one manager. All divisions will report financial billing, collections and receivables information to that manager. It may also be desirable to separate customer types with entities

(commercial customers) receiving particular attention since they amount for an historical 80% of all billing.

5.4 Management and Reporting

Due to the close proximity of Darkhan Division with the head office and the historical relationship of the division and the head office, there is good communication between these offices. However, communication between the other divisions and the head office is more difficult.

As discussed in the section on MIS transfer of data between the separate divisions and the head office needs improvement.

Standard reporting formats and scheduling of this reporting between divisions and the head office should be instigated. Reports should be standardized in an electronic format for incorporation into a report for the entire company and should be submitted at least on a monthly basis and include:

- ***Detailed cost data and performance to budget;***
- ***Customer information, including connections and disconnections;***
- ***Billing details by customer, region, and bill writer;***
- ***Collections by customer and customer type, and***
- ***Receivables information.***

A final combined report should then be disseminated to all district managers in the region. See Appendix 12 for reports presently created, and Section 10 of this report for recommended report formats.

5.5 Business Plans

The Darkhan region has been actively creating business plans, with the Darkhan District submitting a business plan for their particular region. However, business plans from the other divisions have not been done consistently if at all.

Business plans from each division must be created and updated at least on a quarterly basis by the management of that division. These business plans should be submitted to the head office and incorporated into an overall business plan. The head office should create standard formats for these business plans and communicate these formats to the individual divisions. The format and an outline of the contents of a business plan is given in Section 10 of this report.

5.6 Divisions Within DSEDN

Darkhan-Selenge Electrical Distribution Network consists of five separate divisions. A previous Bugant division was merged with the Darkhan Division. A summary of the customer base and billing for these divisions is shown below, along with a table detailing lines and substations in each district.

More historical data regarding these districts are given in Appendix 5. Further explanation of the receivables and losses are also given later in this report.

Table 5-2 Customer Types by District

	Number of Customers				
Customer Type	Entities	Budget	Residential		Total
			Apartments	Gers	
Darkhan EDO	1,834	241	12,409	20,515	34,999
Darkhan	1,033	77	9,055	6,107	16,272
Sukhbaatar	163	66	750	6,459	7,438
Zuunkharaa	336	59	342	5,818	6,555
Shariin Gol	114	9	1,133	800	2,056
Hotol	188	30	1,129	1,331	2,678

Table 5-3 Billing by District

	Billing in First Half 2002, thousand KWhr				
Customer Type	Entities	Budget	Residential		Total
			Apartments	Gers	
Darkhan EDO	93,375	6,631	8,332	7,484	115,822
Darkhan	34,707	2,301	6,216	2,716	45,940
Sukhbaatar	6,258	1,246	526	2,219	10,249
Zuunkharaa	25,266	1,338	163	2,149	28,916
Shariin Gol	11,254	273	564	159	12,250
Hotol	15,890	1,473	863	241	18,467

Table 5-4 Lines and Substations by District

Branches	Overhead lines (km)			Cable lines (km)		Substations, switching centers			
	0.4kV	6kV-10kV	35kV	0.4kV	6kV-10kV	35/6-10	35/0.4	Switch Gear	6-10/0.4
Darkhan-Bugant	202	246.6	165	58.9	120.7	5	3	34	171
Zuunkharaa	172	340.8	253		5.2	4		1	114
Sukhbaatar	93.7	305.2	108		17.6	6		1	84
Hotol	15	193.2	133	2.7	10.2				
Shariin Gol	8.3	32.9		7.3	5.5			1	18
Total	492	1118.7	659	68.9	159.2	15	3	37	387

These branches or districts are further broken down into the following small subdivisions. These subdivisions are primarily for billing and collections and report to their respective division. *These branches are directly connected to the transmission network.

Darkhan Division

- Darkhan
- Bugant
- Eroo
- Huder

Zuunkharaa Division

- Zuunkharra
- Baruunharaa
- *Sumber
- Tunhel
- Bornuur
- Jargalant
- *Ugtaal
- *Tseel
- *Zaamar
- Bayasgalant
- Hailasst
- Erdes
- Boroo

Sukhbaatar Division

- Sukhbaatar
- Altanbulag
- Zuunburen
- *Shaamar
- *Tsagaanuur
- *Zelter
- Dulaanhaan

Hotol Division

- Hotol
- *Saihan
- Sant
- Orhon
- *Maihant
- Orhontuul

5.7 Human Resources

There are a total of 333 employees presently in DSEDN. Managers at the divisions are included as employees of the Central Office.

Table 5-5 Employees

Number of Employees in DSEDN	
Central Office	
Management and Admin	8
Financial and Economic	7
Technology/renovation	6
Transportation	26
Operations and Maintenance	50
Total	97
Darkhan Division	82
Sukhbaatar Division	54
Hotol Division	26

Sharin Gol Division	8
Zuunkharaa Division	66
Total Employees	333

Of these employees, 17.7% are degreed, 59.4% graduated from technical college. About 42.4% are under 35 years of age and 31.4% have been with DSEDN for more than 16 years.

Salaries are based on education and time with the company. There appears to be many individuals at a management level who need to change their management ideas from production based to financial return and efficiency based. Management training to accomplish this change of focus is recommended.

Instituting performance-based reviews, particularly at the management level is recommended. Make any incentive based compensation system clear and communicate this to all employees. Incentive systems need to be based on productivity and contribution to profitability.

6 Financial Data

The following are a summary balance sheet and income statement.

Table 6-1 Summary Balance Sheet

Summary Balance Sheet, First Half 2002 in Tg

ITEMS	Beginning	End
Current Assets	3,767,638,996	4,375,920,941
Fixed Assets	1,277,499,156	1,382,861,694
Total Assets	5,045,138,152	5,758,782,635
Current Liabilities	4,653,966,852	5,329,723,342
Equity	391,171,300	429,059,292
Total Equity & Liabilities	5,045,138,152	5,758,782,634

Table 6-2 Summary Income Statement

Summary Income Statement First Half 2002

Items	Thousand Tg
Total Sales Revenue	4,960,358
Costs of Goods Sold	4,343,590
Total Operating Revenue	616,769
Total Operating Expenses	605,028
Operating Income	11,740
Non Operating Income	24,211
Non Operating Expenses	10,328
Total Profit/Loss	25,624

Complete financial data as received for the first half of 2002 is attached as Appendix 4. The following data is included for the period:

- Balance Sheet
- Income Statement
- Detailed Costs by District
- Cash Flow
- Debts
- Billed and Collected
- Receivables and Collections
- Labor Cost
- Assets

It is no surprise that a key feature of the balance sheet is very high receivables and payables. Of interest is the apparently low asset valuation of about 1.4 billion Tg. This low asset value and low allowed depreciation is a problem with obtaining any funds for necessary repairs and investments. A recent revaluation of the assets was completed in November of 2001 by an independent firm. This revalued asset base is about 7.6 billion Tg, although the basis for this revaluation was not thoroughly reviewed. Since the utility sector in Mongolia historically capitalizes maintenance costs instead of

charging them to expense, the present asset value used is undoubtedly not correct.

According to IAS standards, for all depreciable assets:

- the depreciable amount should be allocated on a systematic basis over the asset's useful life;
- the depreciation method used should reflect the pattern in which the asset's economic benefits are consumed by the enterprise;
- total depreciation should be charged to the income statement, unless it is included in the carrying amount of another asset;
- if the estimate of the asset's useful life changes, the depreciation charge should be adjusted for the current and future periods and
- if the depreciation method changes, due to a change in the expected pattern of benefits, the charge for the current and future periods should be adjusted.

The income statement shows a small net profit for the period. Looking at the balance sheet, collections for past due is increasing, but past due is also increasing.

Although cash flow remained positive, it was at the expense of increased payables.

Serious effort must be made to solve the increasing receivables and payables problem. Revaluation of the asset value should be reviewed and substantiated. Depreciation methodology needs to conform to IAS standards.

7 Technical and Commercial Losses

7.1 Overall System Losses

Technical and commercial losses are high throughout the electric distribution sector in Mongolia. Some of the high technical losses are due to use of equipment such as transformers that were installed during the former economy and sized for much larger usage. In other instances actual technical losses are not accurately known, due to inaccurate or insufficient metering.

The ERA “allowed or projected” losses for DSEDN are 26.4% based on historical annual losses. This is combined technical and commercial losses. Monthly losses will vary by district and by month, but this is the total for the year. Substantial improvements by management have been made in lowering these overall losses.

According to the ERA it is possible to lower overall system technical losses (including transmission) to a 12% level. Accurate measurements at the high voltage level indicate losses of 4%, leaving minimum obtainable technical losses at distribution of 8%. However, this level of technical losses will require substantial investment in equipment, including total replacement of some existing equipment.

Projected technical losses for 2002 will approach 60,000,000 KWhr or about 22% of the total electricity purchased for distribution. For the year 2003 the following losses by voltage are projected:

Table 7-1 Forecast Losses for 2003

Voltage Level	Forecast Loss
0.4 kV	10%
6-10 kV	4%
35 kV	5.5%
Total	19.9%

For the first half of 2002 there has been an apparent substantial reduction in commercial losses from the data in 2000 and 2001. From discussions with management this appears to be a change in the methods used to calculate commercial losses. Overall losses are known, and estimation of technical losses is subtracted from that overall number to arrive at commercial loss figures. In other words, metering is not presently in place to accurately measure the separate losses of technical and commercial.

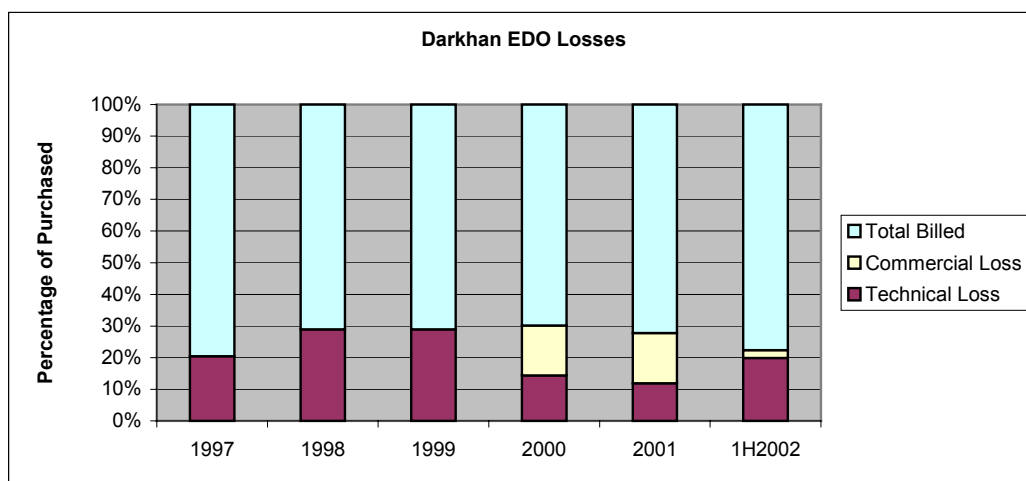
Appendix 12 shows what metering is presently in place and how many additional meters are required.

A chart and graphical representation of the trends of total billed and losses for the previous years is given below. This diagram indicates that losses have effectively returned to the same level as in 1997, but are presently trending down. Detailed losses by division are given in Appendix 5.

Table 7-2 Summary of DSEDN Losses

Thousand KWhr						
Darkhan EDN	1997	1998	1999	2000	2001	1H2002
Purchased	301,988.9	309,972.1	320,051.5	319,247.1	305,166.6	149,175.0
Technical Loss	61,854.2	89,626.6	92,625.9	46,051.0	36,153.0	29,691.0
Commercial Loss				50,641.8	48,500.5	3,662.0
Total Billed	240,134.7	220,345.5	227,425.6	223,658.1	220,516.2	115,822.0

Figure 7-1 Losses by Year



The apparent large fluctuation in technical loss shows the need for improved data collection and indicative of the need for additional metering.

7.2 Technical Losses

Investing in equipment necessary to decrease technical losses can have a high rate of return. The present wholesale cost of electricity to the distribution company is now about 30 Tg/Kwhr. At this wholesale cost, an Internal Rate of Return of 25% (Over 5 years) is possible if an investment of 80 Tg creates an annual savings of one KWhr. In other words, investing almost \$3 million to save 40,000,000 KWhr annually in technical losses is reasonable.

Any improvement in technical losses will make significant funds available to the company without any change in tariffs.

It is estimated that 30% of the technical losses in the system are due to line losses, and 70% of the technical losses are due to transformer losses. About three-quarters of the installed transformers are operating at only 10-30% of designed load, leading to very inefficient operation.

In addition to the installation of security boxes, further measures to reduce technical and commercial losses are being made, including:

- Increasing transformer efficiency by combining more customers on single transformers;
- In some cases installing more low-voltage transformers to replace high-voltage transformers;
- Optimizing line routing;
- Increasing the heights of poles;
- Replacing overhead lines with cable lines;
- Replacing feeder lines with underground cable lines;
- Introduction of a prepayment system, and
- Installation of advanced electronic meters.

Obtaining funding for technical improvements is critical for lowering technical losses in the system. Cost-benefit analysis should be done for each planned investment to identify the best investment potential.

7.3 Commercial Losses

Eliminating commercial losses particularly at the residential level will be difficult. The first step to reducing these losses is accurately identifying them. This should be done by metering usage at individual 0.4 kV levels by region or circuit and comparing these measured amounts to total amount actually billed in that region. Since technical losses are fairly low at this voltage level and can be estimated accurately, overall commercial losses by region can be calculated. The bill writer for this region can then be tasked to identify commercial losses in his area for enforcement.

To stop illegal connections from continuing will require the full support of the law in the area. Thieves will have to first be severely warned and then prosecuted as prescribed within the existing Laws of Mongolia. Ongoing patrols of those areas where there are continuing problems with losses.

Aggressively patrol and remove illegal connections wherever possible. Begin a customer campaign that reinforces the fact that illegal connections must be paid for by those that receive electricity legally, and that these losses affect the tariff. Develop a schedule and plan for identifying and removing illegal connections.

7.4 Investment Plans

As has been mentioned, there are inadequate high-voltage meters in place to monitor the energy balance in the system. Replacement of transformers and lines is also necessary to improve efficiency in the system. These estimated costs are given below, but no costs were received for the installation of new lines. There are anticipated savings of about 94,000,000 Tg over an eight year period due to the lower cost of testing these electronic meters. For these investments a cost benefit analysis needs to be done to determine the priority in which to make the investments. Competitive bids need to be made for the equipment.

Table 7-3 Planned Investments

	Quantity	Cost Each (thous.Tg)	Total Cost (thous.Tg)
Meters			
380V Meters	1,959	450.0	881,550
100V Meters	474	2,500.0	1,185,000
6-10kV transformers	948	50.0	47,400
0.4kV transformers	12,408	15.0	186,120
	Total		2,300,070

Overhead Lines	Length (km)		
4 parallel lines, Type AS-25	776		N/A
2-3 parallel lines, Type APV-25	397		N/A
2 parallel lines, Type A-16	200		N/A
	Total		

8 Billing and Collections

The system of billing and collections is critical to the success of commercialisation within the electric distribution sector. The present billing system that is in place is a remnant from the former centrally planned economy when energy was cheap and customers reliably paid for electricity received. In particular since the utility and industry were wholly owned by the state, receivables for the individual distribution company were not a serious issue.

The following graphs show the trends of billing compared to purchased electricity since 1997, percentage of total billed at each division and the trend of receivables for the same time period.

Several observations can be made:

- There has been very little change in the customer split over the last five years (Figure 8-1);
- Sales at the individual divisions within EDO have also not changed appreciably (Figure 8-2, also note the merger of Bugant with Darkhan in 2002).

Figure 8-1 Billing, KWhr

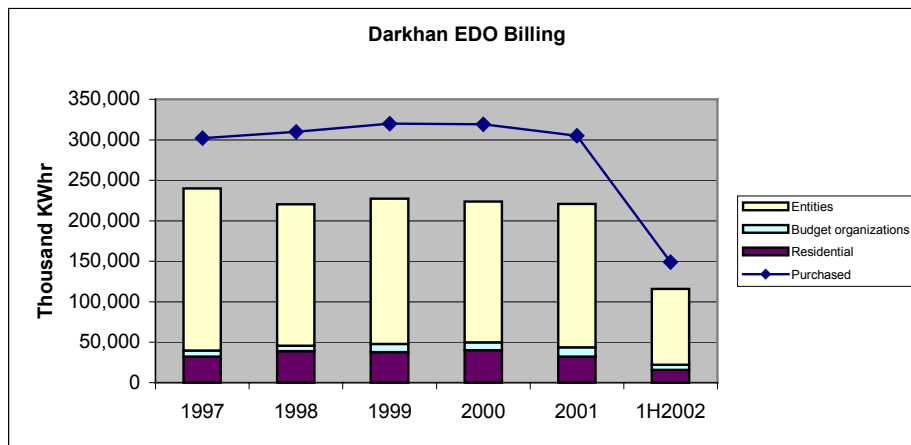
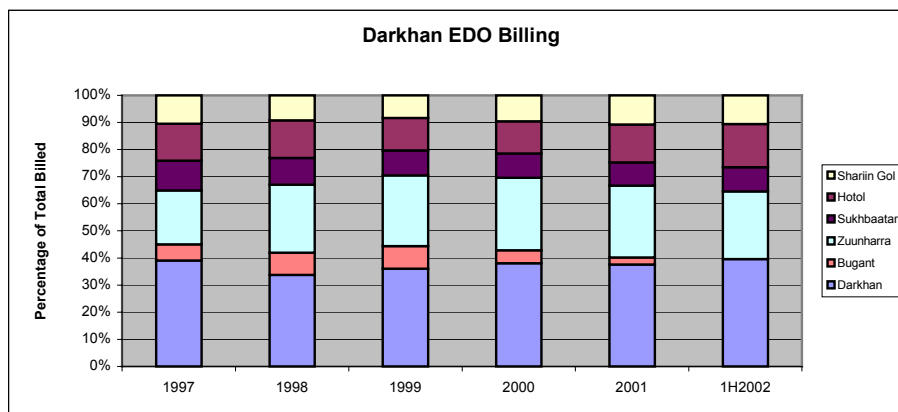


Figure 8-2 Billing, Tg



8.1 Receivables

The issue of receivables is a large and growing problem at DSEDN. The trend of receivables is shown in table and graphical form below:

Table 8-1 Receivables of DSEDN

Million Tg	2001											
	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Residential	1,433	1,499	1,575	1,617	1,667	1,692	1,749	1,757	1,765	1,696	1,705	1,399
Budget	68	101	130	145	164	151	157	45	58	83	108	118
Entities	1,241	1,296	1,272	1,424	1,599	1,705	1,867	1,530	1,654	1,320	1,481	1,558
Total Receivables	2,742	2,896	2,977	3,185	3,430	3,548	3,773	3,332	3,476	3,099	3,294	3,076
Million Tg	2002											
	Jan	Feb	March	April	May	June						
Residential	1,449	1,534	1,544	1,544	1,561	1,561						
Budget	179	222	243	221	254	269						
Entities	1,771	1,871	2,001	1,613	1,823	2,036						
Total Receivables	3,398	3,627	3,788	3,379	3,638	3,865						

Figure 8-3 Total Region Receivables

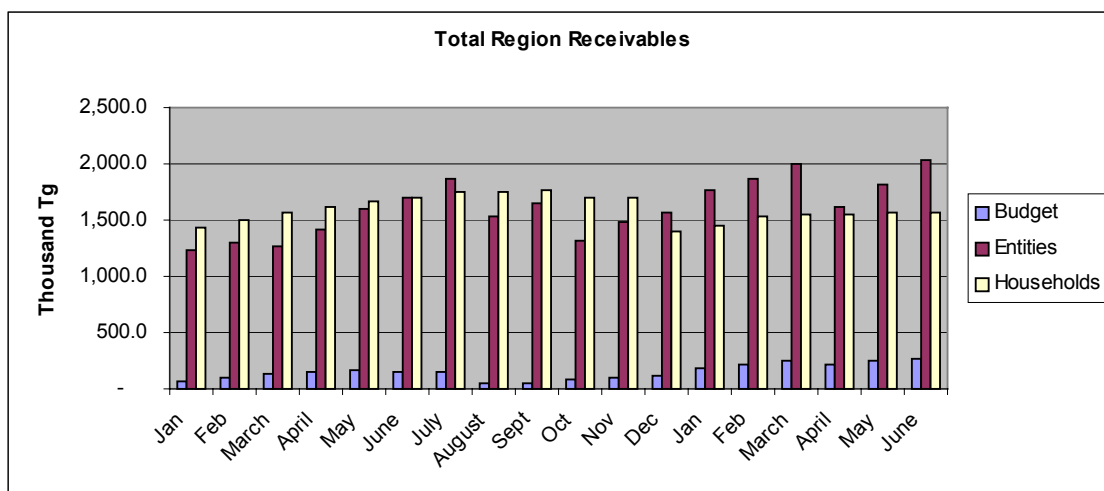


Table 8-2 below details the amounts due from the largest debtors in the region. Note that these top debtors account for almost 50% of the total receivables at DSEDN, and that the top five debtors account for 40% of the total.

Table 8-2 Largest Debtors

Largest Debtors in Darkhan Selenge Electric Distribution Network (As of 1 August)	Total Arrears	% of Total	Consumption	Billing	Average Months in Arrears
Name	Million Tg		Thou. KWhr	Million Tg	
Khotol Cement Plant	1113.5	60.2%	2,124.0	95.6	11.7
Khailaast Gold Mining Company	156.2	8.4%	142.0	6.4	24.5
Orkkhontuul Village Substation	118.3	6.4%	153.8	6.9	17.1
Steel Factory	105.4	5.7%	1,659.2	74.7	1.4
Altan Dornod Mining Company	64.0	3.5%	1,153.6	51.9	1.2

Selenge Energo	48.7	2.6%	184.2	8.3	5.9
Selenge Public Utility	40.2	2.2%	117.0	5.3	7.6
Boroo Gold Mining Company	36.7	2.0%	54.4	2.4	15.0
Khotol Water Supply	30.2	1.6%	261.5	11.8	2.6
Darkhan Flour Factory	27.8	1.5%	117.4	5.3	5.3
Meat Export	27.6	1.5%	123.0	5.5	5.0
Ikh Gold Mining Company	21.3	1.2%	47.9	2.2	9.9
Baroon Haara Water Supply Company	14.1	0.8%	242.4	10.9	1.3
Selenge Flour Factory	12.9	0.7%	171.8	7.7	1.7
Khauchuu Gold Mining Company	11.2	0.6%	56.4	2.5	4.4
Mic Mining Company	10.1	0.5%	35.7	1.6	6.3
Ugtaal Co. Ltd. (insolvent)	10.1	0.5%	n/a	0.0	n/a
Zaamar boiler	3.3	0.2%	7.6	0.3	n/a
Zaamar secondary school	9.1	0.5%	5.0	0.2	n/a
Erel cement factory	9.6	0.5%	918.7	41.3	n/a
Mik mining	10.1	0.5%	35.7	1.6	n/a
Total	1,848.30		7,611.3	299.0	

Total consumption of these largest debtors amounts to about 38% of the total sales of DSEDN.

This chart indicates that several of the largest debtors are less than 60 days in arrears. However, the amount due from the top debtors is from an equivalent of one year to two years of billing. These customers require special treatment in terms of credit and collection issues.

A strategy needs to be developed to begin collecting all current billing on a continuous basis, and negotiate terms for repayment of the past due amounts.

8.2 Billing Methods

The present billing system is a combination of actual meter reading and estimation under an “open tariff” system. The open tariff system was designed to estimate electrical consumption based on the number of lights and outlets at the customer. For apartment owners, this estimate is very high. It was thought that this very high billing rate under the “open tariff” system would motivate the customer to replace any broken or stolen meters.

At the ger level the “open tariff” is probably fair considering that most gers have one light and one outlet.

The table below is a summary of broken and missing meters for the Darkhan District.

Table 8-3 Metering Status

Residential customers of DSEDN

District	Number of households	Metered	W/O Meter	Lost Meters	Broken Meters
Darkhan	15,595	13,059	1,931	344	261
Zuunkharaa	9,214	5,736	1,430	18	2,030

Sukhbaatar	7,498	5,775	1,381	69	273
Shariin Gol	1,932	1,218	686	28	
Hotol	2,459	1,882	577	-	-
Grand Total	36,698	27,670	6,005	459	2,564

It was reported that overall, 70% of total ger residents have meters, and 90% of apartment residents have been metered. However, these are old mechanical meters that need to be replaced with electronic meters, owned and maintained by the Distribution Company, in accordance with the Energy Law.

To replace all residential mechanical meters with electronic meters is estimated to cost 640,000,000 Tg (about 34,000 meters at 19,000 Tg each)

Replacing of meters at all industrial customers is estimated at 980,000,000 Tg with installation of about 2,200 meters at an estimated cost of 450,000 Tg each.

Installing new meters at high voltage industrial customers is budgeted at 105,000,000 Tg with about 42 new meters installed at a cost of 2,500,000 Tg each.

The bill writer is required to visit every commercial and domestic customer they have been assigned in their region. During this visit either the meter is read or an estimate is given on usage based on the “open tariff” or a “negotiated” quantity. A bill is written and a copy given to the customer for payment. At the same time an entry is made in the bill writer’s ledger indicating the current billing amount. This ledger also tracks amounts past due. The customer also has a ledger that they are supposed to maintain, but it is not usually maintained or has been lost. Samples of these bills are shown in Appendix 7.

Past due amounts should be indicated on the current bill given to the customer.

Penalties for non-payment of all past due amounts both for entities, budget and residential customers should be calculated and billed.

The bill writer takes the original copy of the bill back to the office and the quantity used and amount billed is entered into the computer system.

The customer takes the bill to the bank and pays an amount due. A company representative goes to the bank and recovers the bills that have been paid. This paid amount is then entered into the computer system.

If the customer takes an older bill to the bank and pays that amount, it is shown in the computer system as payment for “past due”.

It is recommended that payments received should first be applied to the oldest receivable on a consistent basis, irrespective of the

“actual” bill payment submitted. This is standard procedure in utility billing, and lowers the balance sheet entry for the oldest accounts receivable.

From review of the customer data base, there are many customers who do not appear to have current consumption of electricity. These customers are not billed for that period. This error could be due to errors of the bill writers, or the customer data base being not properly maintained on the computer.

All customers that owe money should be billed on a monthly basis, even if there is no usage for that month. Particularly those that have past due amounts need to be reminded of that debt.

All past due accounts need to be accurately aged in order to calculate penalties.

Although each district has some sort of computer billing system, the reporting to the head office is not consistent and is manually input (See MIS section 9).

Progress has been made in the installation of secure meter boxes. The installation of these security boxes at the apartment level has a very high investment recovery, as calculated from historic data. Preliminary Internal Rate of Return calculations indicate returns as high as 35% over a five year period resulting from the installation of these secure meters.

Where the potential return is high, it may be reasonable to install pre-paid meters.

During the last year, 4,632 meters for apartment residents and 2,606 meters for ger residents were installed in security boxes at a cost of 87,446,000 Tg. This amounts to 36.6% of apartments and 12.4% of gers.

Individual costs of installing secure meters were 48,500 Tg per apartment and 61,000 Tg per ger. A summary of costs to complete the installation of secure meters is tabulated below.

Table 8-4 Security Meters Costing

Branches	Apartments			Ger Residents		
	Meters to be made secure	Cost per meter (thous.Tg)	Total cost (thous.Tg)	Meters to be made secure	Cost per meter (thous.Tg)	Total cost (thous.Tg)
Darkhan-Bugant	6,098	48.5	295,753	4,038	61.0	246,318
Sukhbaatar	476	48.5	23,086	6,015	61.0	366,915
Zuunkharaa	360	48.5	17,460	6,371	61.0	388,631
Shariin Gol	573	48.5	27,791	788	61.0	48,068
Hotol	-	48.5	-	922	61.0	56,242
Darkhan	6,098	48.5	295,753	3,690	61.0	225,090
Total	13,605		659,843	21,824		1,331,264

Note the high costs for installing secure meters in the Ger districts. With the presently low electric usage of these gers, installation of secure meters may not presently provide a reasonable rate of return for the investment.

The decision to install security boxes at specific locations should be made based on financial analysis of their benefit. For example, security boxes at the ger level will probably not make as large a return on their investment as at the apartment level due to the low electrical usage at the gers. For this reason, security meters at the customers with higher usage should be installed first.

8.3 Bill Writers Tasks

The Darkhan District has instituted a salary schedule for the Bill Writers based on percentage billed and collected. A copy of this schedule is given in Appendix 8. This schedule varies according to the type of customer. For example a bill writer with all gers in their district will have a more difficult time collecting and billing.

Performance based salary for the Bill Writers is an important step. Furthering this concept would have each 0.4 kV region separately metered and assigned to individual bill writers. This would allow monitoring of total usage within the bill writers territory. With this monitoring commercial losses could be easily identified.

For internal control purposes, bill writers should be moved between areas on a periodic basis. With the installation of additional metering capacity, it will be possible to accurately determine commercial losses in each bill writer's territory.

8.4 Recourse for Non-payment

The only real recourse for non-payment for electricity is disconnection. The Energy Law is clear on the right of a supplier to disconnect for non payment. However, there are serious problems with disconnection. These problems include

- Technical difficulty, i.e. it is physically very difficult to disconnect the non-payer without disconnecting those that are paying.
- Disconnection is very difficult to enforce, particularly at the residential level. Most customers can reconnect themselves.
- There are political and ownership restraints to disconnections. Many of the entities are state-owned and there is extreme pressure to maintain connections.
- For industrial and large commercial customers it is sometimes to the utility's best interest to develop a plan for settling the past debt while allowing them to remain connected and paying for current consumption. Any customer who needs electricity to earn income will never be able to settle the account if disconnected.

In order to effectively use disconnection as recourse, there must be a defined method of warnings prior to disconnection. In

addition the threat of disconnection has to be effectively communicated to the customer and enforced without prejudice.

Require a deposit for to reconnect customers who have been disconnected for non-payment.

8.5 Collecting Past Due Accounts

In order to collect past due accounts there must be a consistent penalty invoked for not paying and the customer continually informed of the amounts past due. There are penalties invoked for some entities, but there is a large amount of flexibility in invoking these penalties

If accounts are truly non-collectable, a system for writing them off as bad debt needs to be instituted and followed.

Offsetting debt with entities is a viable alternative to collecting the past due amounts from budget entities as long as the transactions are transparent. Unfortunately, the Ministry of Finance and Economy recently agreed with the IMF to discontinue this practice.

The use of debt to equity swaps could also be utilized where feasible, although this would be a last resort as it is difficult to easily value equity of Mongolian companies.

With the large and increasing amount of receivables it would be effective to form a separate division of the company, staff the division with young, aggressive and well paid employees and task them with nothing but collecting the old debt.

Serious efforts have been implemented by Management to collect past due accounts. As an example, a list of all residential customers that owe over 400,000 Tg was given to all employees. Any of these employees can collect this debt and will receive 5% of the amount collected.

These types of very cost effective measures to collect debt from customers are to be encouraged.

Large and very old receivable accounts could possibly be transferred or sold to another company that specialized in collections. However, any sale of these accounts would have to be closely monitored and the sale price collected before the collection company actually makes the collection, as auditing will be very difficult. Significant portions of these older accounts receivable are probably uncollectible and should be written off. This could result in writing off as much as 50% of the total receivables.

8.6 Bill Frequency Analysis

Using "raw" data obtained from the computerized customer data base a simple bill frequency analysis was performed. Data was obtained for both

residential and industrial customers for February and March of 2002. March data for Hotol and Sukhbaatar was not available.

Residential Customers

Analysis of this data indicates that a substantial portion of the residential customer base was not billed during this period of February 2002; or if they were billed this information was not entered into the customer data base. Additionally, the customers who were not billed amounted for a very large portion of the accounts receivable. There is inherent errors in this data due to billing under the “open” or estimated tariff and because of many missing or inaccurate meters, however some interesting observations can be made.

Fully 50% of the customers used less than 100 KWhr a month, and 80% used less than 200 KWhr per month. At the present tariff rate, this amounts to about 5000 Tg/month for half of the customers and less than 10,000 Tg per month for 80% of the customers. There is even lower use rates in the more rural regions. This data is shown graphically in Figures 8-4, 8-5 and 8-6. Additional graphs for the incomplete data received for March are given in Appendix 9. Complete data is also tabulated in Appendix 9.

This means that of the total revenue from sales in DSEDN, half of the residential customers (about 17,000) account for less than 2% of the total billing in the region.

Establishment of a “Life Line” tariff would have minimum affect on total income of DSEDN, particularly if payments in the other sectors could be improved.

Figure 8-4 Residential Customer Billing February

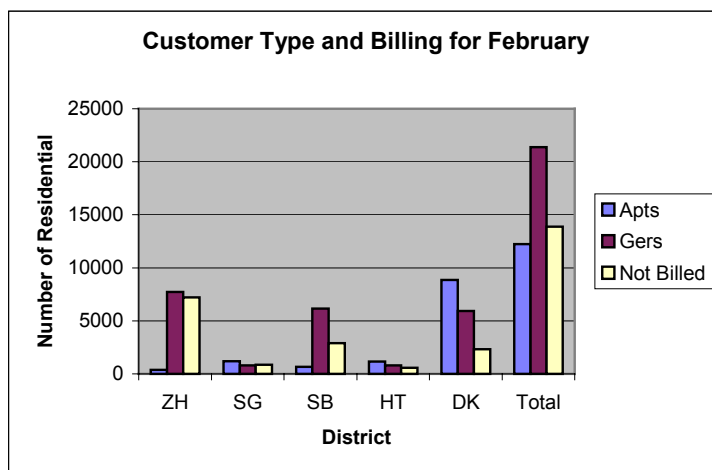


Figure 8-5 Residential KWhr Usage February

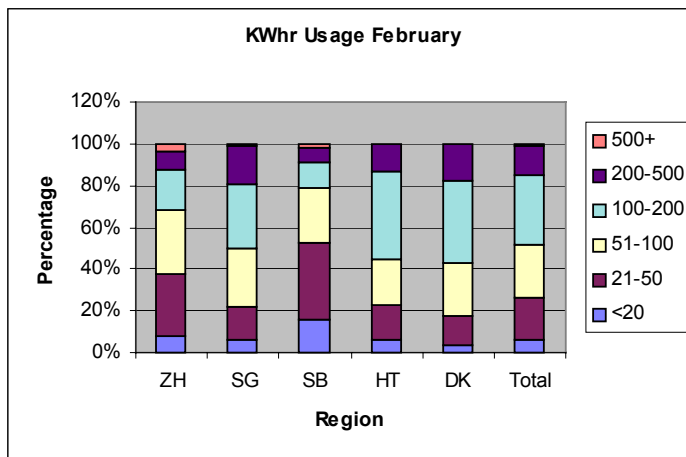


Figure 8-6 Residential Usage by Region February

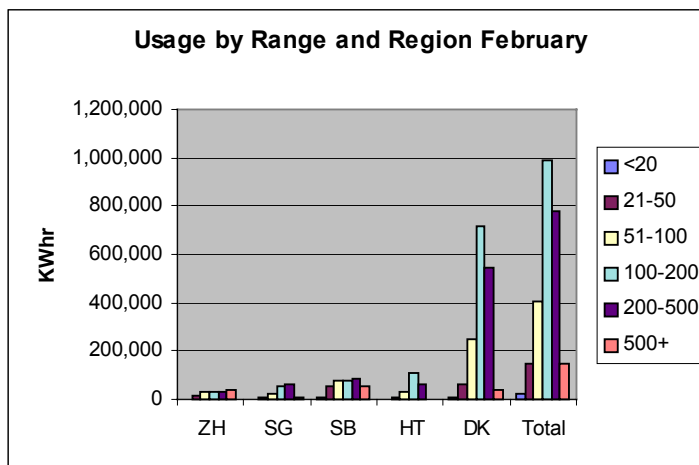
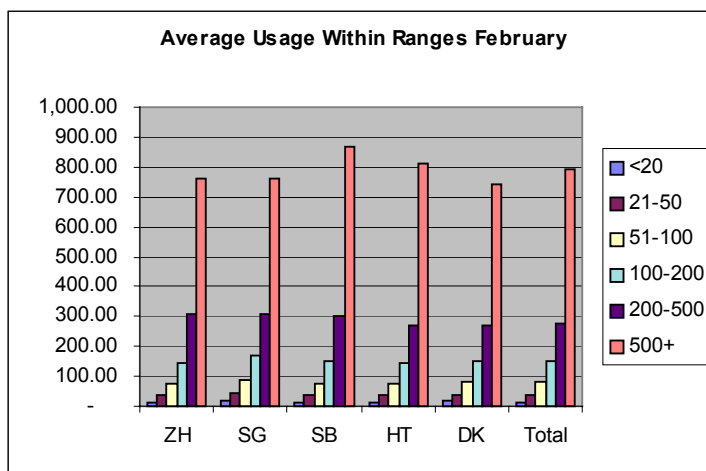


Figure 8-7 Residential Average Usage February



Industrial Customers

For industrial customers, a similar analysis to that of residential customers was done. This data is graphically portrayed on the next page, and detailed data given in Appendix 9.

At least for this month of February 2002 a similar issue related to either lack of billing or lack of entering data into the data base is seen. Also, no data was available electronically for the Hotol and Sharin Gol districts. The lack of data does not allow a truly accurate depiction of industrial usage in the region, but the data is indicative.

More than 60% of the entity category of customers use less than 5,000 KWhr a month and almost all (97%) of the customers use below 20,000 KWhr a month. A very few large industrial customers account for the major consumption in the district, and in fact 17 customers use about 60% of all electricity delivered in the district.

Figure 8-8 Industrial Billing February

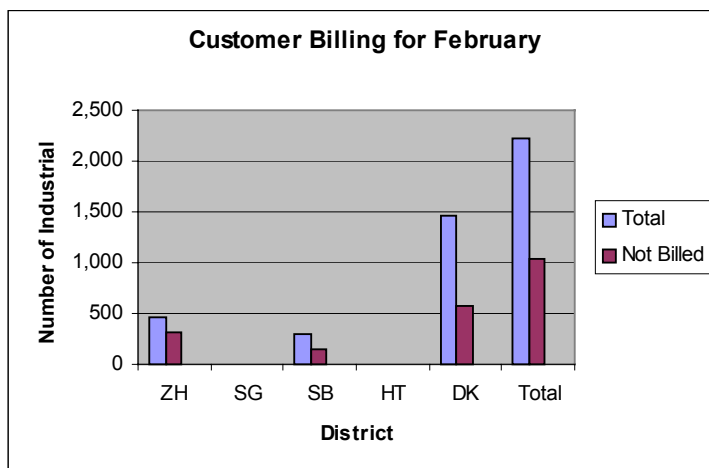


Figure 8-9 Industrial Usage February

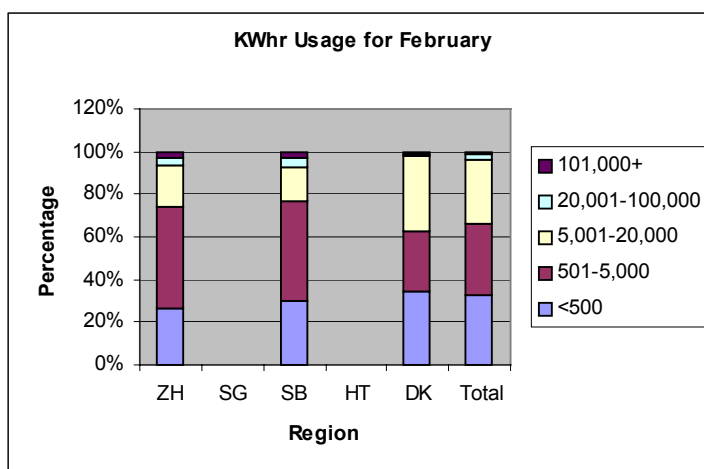


Figure 8-10 Industrial Usage February

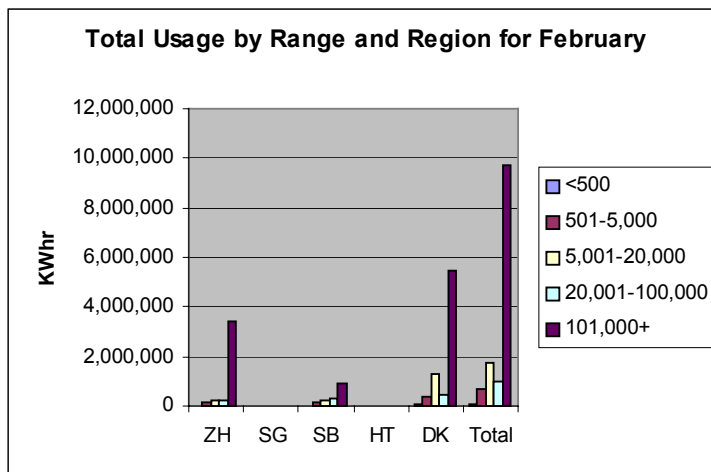
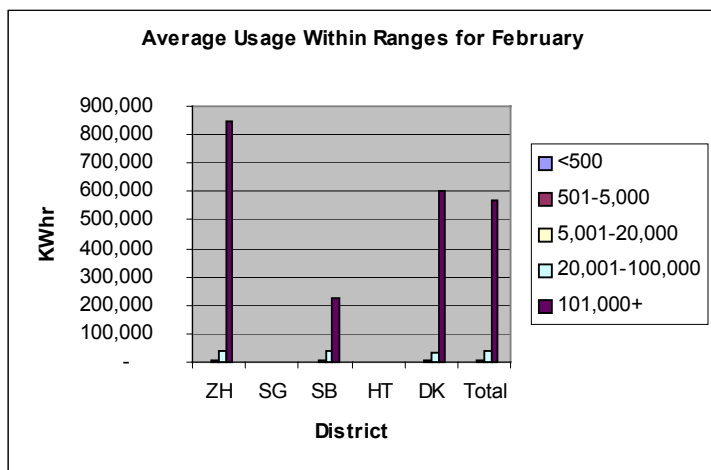


Figure 8-11 Industrial Average Usage February



The use of bill frequency analysis should be continued by DSEDN. These analysis can be used when dealing with ERA and identifying the characteristics of customers on a regional basis to allow focused information dissemination. The results of this preliminary work also indicated that the customer data base needs to be updated.

9 Management Information Systems (MIS)

9.1 Development of MIS Systems

During the mid to late 1990's a project was funded by ADB to develop and install computerized financial (Platinum) and billing systems into the entities that comprised the Central Electricity System (CES) of Mongolia. A project team was formed within the Energy Authority that comprised Mongolian financial and IT personnel with power industry experience, supplemented by experts from Arthur Anderson. This team developed the systems, trained entity staff and installed the necessary computer hardware and application systems in DSEDN in 1998/99.

Support for problems was provided by the EA project team at first but this team was disbanded in February 2000 and from that point DSEDN has had sole responsibility.

9.2 Financial Systems

The financial systems are based on the Platinum package and DSEDN has the later version that is Microsoft Windows based and provides some level of integration between the general ledger and sub ledgers. DSEDN has installed the general ledger, supply ledger and materials subsystems and these pass data automatically to the general ledger in the Head Office via a local area network. Payroll is on a separate system and analyzed data is manually entered to the G/L at the end of each month.

This system is also installed in the three divisions of Darkhan, Zuunkharaa and Sukhbaatar. However, summarized data is then re-entered in the Head Office for the consolidated report. The data for the divisions of Shariin Gol and Hotol is sent on paper to the Head Office for entry to the system.

At the end of each month the system produces an account listing, income statement and balance sheet.

The final consolidation and budget comparison is done using separate Microsoft Excel reports by the Economist who must re-enter data. These reports meet the requirements for reporting to government regulatory bodies in Mongolia.

The accounting system now in place somewhat follow International Accounting Standards, but is not in total compliance.

9.3 Sales and Billing System

Each branch has separate sales and billing systems that keep track of consumer accounts and provide various analysis to determine technical and commercial losses and management of meter readers performance.

The process for producing bills is fully “Bill in the Field” for both business entities and householders. The meter reader reads the meter (if there is a meter) and completes a bill in duplicate, leaving both copies with the consumer. He also enters the billed amount in his ledger, which is used to maintain a running total of amounts billed, paid and past due. The ledger is also utilized as the input voucher for the consumer billing system. After the meter reading data is entered the computer checks the meter reader’s calculations and accepts or rejects the reading. Any rejects are returned to the meter reader for correction and that may require another visit to the consumer.

If no meter is present, the “open tariff” is used based on the number of outlets and lights in the residence. A problem is that the computer software does not have the capability to calculate tariffs based on the number of outlets and lights. In this case a usage number is entered based on the estimate from the bill writer.

The consumer is given 10 days to pay the account by going to a bank and making payment. The bank issues a receipt for the payment and keeps a copy of the bill to give to DSEDN and transfers the payment to DSEDN’s bank account. Each day a collector from DSEDN goes to the banks to pick up payment information that is then processed to the consumers account. The consumer can pay directly to the DSEDN cashier and about 3% of collections come from this source.

At the end of the month a report is produced showing unpaid accounts and follow up letters are issued that give the business entities one month to pay or be disconnected and the household consumer two months notice of disconnection.

In June of 2002 a total of 60 business entities were disconnected and 1200 households. A re-connection fee of Tg 7,000 for business and Tg 1,000 for householders is charged. Many consumers have the ability to illegally reconnect themselves.

9.4 Computer Equipment

DSEDN has 39 computers installed in the following locations:

Table 9-1 Computer Equipment

Head Office	18
Darkhan Sales office	11
Sukbahbaatar	2
Hotol	1
Sharin Gol	1
Zuunkharaa	6

Of these, five computers are in an unusable state. The full inventory of computer equipment is listed in Appendix 10.

In the Head Office a local area network has been installed that allows data to be transferred between workstations.

There is no connection between the Head Office and branches.
In the Darkhan sales office there is no local area network. In fact most of the computers are used for single purpose only i.e. household accounts, commercial accounts.

Many of the computers are older 386 and 486 styles so are slow and cannot use later versions of software products.

9.5 MIS Management

The Chief Accountant is responsible for financial systems and the branch managers are responsible for their branch systems. Information Technology technical assistance is provided by one of the engineers who spends about 20% of his time related to IT matters.

9.6 Adequacy of Present IT Systems

The present systems are providing an adequate level of support for this organization but require considerable manual effort to produce the management reports at the end of the month and quarter. The organization needs to also monitor its cash flow situation as in a commercialized enterprise availability of cash is vital. The sales office is getting adequate information to identify overdue accounts and where losses are occurring in the supply network. The issue for Darkhan is taking effective action on the problems that the reports highlight particularly since management is constrained by the Government of Mongolia from taking effective legal action against many commercial enterprises.

The following issues were identified and discussed with the executive group:

- The Head Office and the three biggest branches have a version of the software and process their own accounting transactions. At the end of the month a transaction listing is sent to Darkhan at the end of the month that has to be re-keyed into the Home Office ledger to produce the consolidated report.
- Much of the equipment was installed in 1998 and is now lacking in capacity and not capable of being linked into a Local Area Network (LAN).
- Financial reports only contain actual figures for the month and year to date and do not include comparisons with budget.
- The systems are supported by an engineer on a part time basis.
- Billing system follows ADB model but equipment is old and not integrated into a network. Each computer is its own freestanding system i.e. household customers, commercial customers.
- Meter readers in the field complete both household and commercial billing and leave with the consumer. Data is input into the computer

that recalculates the bill, results compared and corrections made where necessary.

- Audit of these readings is limited.
- Reports are produced showing overdues by meter reader but action to disconnect takes between 2 to 3 months from payment due date before the disconnection is performed.
- Customers have the ability themselves to illegally reconnect to the system. Apartment meters are being housed in locked meter boxes to prevent this from occurring.
- Poor backup for these systems. Generally backed up on paper or on the same computer system.
- No protection against computer viruses is being taken.

9.7 Recommendations for MIS Development

The following are our recommendations to strengthen the MIS systems at DSEDN. These were discussed with the DSEDN executive group:

Consider actions to increase early payment percentage:

- Create the position of MIS Manager and give that person overall responsibility for planning and management of the organizations IT and MIS systems. A job description for such a position is included in Appendix 11. Under the present organizational structure in Appendix 2, this position could report to the Deputy Director Financial Issues.
- Authorise the MIS Manager to develop a plan and budget to upgrade computer systems, extend the LAN in the Head Office and link the sales and distribution office with the Head Office.
- Develop a capability to transfer branch data to the Head Office by diskette to save re-keying information.
- Develop a plan to train staff in the use of the MIS system.
- Stop creating the commercial bills in the field. By creating these bills in the field the overdue balance is not immediately obvious on the bill as it is when the bill is produced in the office. There are also opportunities for collusion if the billing process is fully completed in the field. The meter reading process will be much quicker if the meter is just read and that information brought back to the office for bill completion the bills. Following meter reading prepare the bills in the office including any overdue balance and deliver to customer by someone other than the meter reader. Include monthly and year to date budget figures in financial reports and compare actual results against budget.
- Prepare cash flow forecasts and monitor these against actual cashflow.

- Depreciate IT hardware and software over a four year period and use that depreciation to fund the purchase of replacement equipment and software upgrades.

10 Recommendations and Implementation

This section is a summary of the recommendations discussed in the main body of the report along with details on the issues involved, implementation of the recommendations and a timeline. Additionally, responsibility for accomplishing each task and anticipated results of implementing the recommendation are given.

Many of these recommendations are strongly dependent on obtaining funding for investment requirements. This will remain the major challenge for DSEDN, and indeed for the entire energy sector in Mongolia. Section 11 discusses some possibilities for obtaining this necessary financing.

The accomplishment of all these tasks within a reasonable timeline is daunting, but small steps can result in large improvements. As mentioned several times in this report, it is a critical first step that DSEDN evaluates investment requirements based on accurate costing and determination of the financial benefits of the investment.

Complete commitment of the Government of Mongolia, State Property Committee, Ministry of Finance, and the Ministry of Infrastructure through the Board of Directors is absolutely necessary for the success of commercialization at DSEDN. The support of these government agencies must be strong and continuing.

10.1 Restructuring of the Board of Directors

Background of the Issue

The present Board of Directors presently consists only of shareholders of the company, which consists of representatives from the State Property Committee, Ministry of Finance and Ministry of Infrastructure. Many of these members also serve on the Board of Directors for large customers of DSEDN. This creates a severe problem of conflict of interest.

Preconditions

Amend law if required to allow structure change of members on the Board of Directors. According to Article 75.4 of the Company Law of Mongolia non-shareholders can be members of the governing board. This indicates that members other than shareholders can be on the board if the shareholders approve these candidates.

Summary Action Plan

Task	Responsibility	Time Frame
1. Review and amend Law	SPC, MOI, MOF, possibly Parliament	Complete by 3Q2003
2. Restructure of Board of Directors	Board of Directors	3Q2003

Results Expected:

1. Will eliminate conflict of interest between directors that sit on the boards of affected companies.
2. Will increase input into operations of the company by the Executive Director of the company, and allow more balanced "outside director" influence on company operations.

10.2 Restructuring of the Organization

Background of the Issue

Financial accountability and responsibility relationships not clear. Reporting and management of divisions within the company needs to be clarified.

Preconditions

Clarification of issues related to legal signature requirements of the Executive Director.

Summary Action Plan

Task	Responsibility	Time Frame
1. Improve Management Information Systems	MIS Manager	1Q2003
2. Standardize Management Accounting reporting formats particularly to top management.	MIS Manager, DSEDN Management	2Q2003
3. Clarify and possibly re-write job descriptions.	Human Resources, DSEDN Management	2Q2003
4. A simple recommended organizational structure is given in Appendix 3.		

Results Expected:

1. More effective tracking of financial issues to improve financial decision making.
2. Efficiency improvements and more cost-effective management at the division and regional level should be the goal.

10.3 MIS Implementation

Background of the Issue

Limited utilization of MIS within DSEDN. Some of the computer equipment is based on what is now obsolete architecture i.e 386 PC's and some of the equipment is damaged and unusable. Also various levels of software are being used (See report section 9.4 and Appendix 10). Transfer of information from the branches is on paper and must be re-keyed at the district level. No electronic history maintained, no data back-up. Need for information to be exchanged between computers in a controlled manner.

Preconditions

To manage this environment DSEDN firstly need to appoint a competent MIS/IT Manager as discussed earlier in this report. This person should develop a needs analysis of future requirements then fully assess the present equipment to determine what has a future life and what needs to be replaced. A plan can then be produced and costed over say a two year period to enhance the installation to meet future requirements.

Summary Action Plan

Task	Responsibility	Time Frame
1. MIS manager appointed and develops budget and implementation plan. Management agrees on a plan for the future and works progressively to replace equipment and software that doesn't fit that plan. Purchase or lease required equipment, and train staff on the new system. Begin transfer of data and reports via electronic format.	DSEDN Management and Human Resources Department	1Q2003
2. Purchase or lease required equipment, and train staff on the new system.	MIS Manager	2Q2003
3. Begin transfer of data and reports via electronic format.	MIS Manager, Department Managers	2Q2003

Results Expected:

1. Higher efficiency and tracking of billing and collections.
2. Lower personnel requirement.
3. Availability of historical data electronically.
4. Financial reporting for tax and ERA easier.

10.4 Standardization of Reporting Formats to Upper Management

Background of the Issue

Although many reports are created within the company, summary reports should be developed. Many of the reports are done in paper format that must be “re-keyed” at the District level.

Preconditions

Investment in upgraded MIS system, hiring of MIS manager.

Summary Action Plan

Task	Responsibility	Time Frame
1. Reporting formats developed.	Management of DSEDN	1Q2003
2. Implementation of information flow from branches to the division level	MIS Manager	2Q2003
3. Reporting Key Summary Data in Appendix 12.5	Management of DSEDN	2Q2003

Results Expected:

1. Will allow better tracking of financial issues within the company, including collections and accounts receivable.

10.5 Investment Decisions Based on Financial Return

Background of the Issue

There are large investment needs at DSEDN, and limited investment funds available.

Preconditions

Limited funds available for investment

Summary Action Plan

Task	Responsibility	Time Frame
1. Obtain accurate pricing for all desired investments and determine potential savings if investment is made.	Board of Directors, Executive Director, Financial and Technical Deputy Directors	Initiate by 1Q2003, continuing effort
2. Evaluate Return on Investment (ROI) for each investment and make decision for the investment based on the ROI.		Continuing Effort

Results Expected:

1. Optimum utilization of limited investment funds.

10.6 Creation of Focused Business Plan at Each Branch and at the District Level

Background of the Issue

Business plan has been developed within DSEDN. The business plan needs to be put into a more standard western format. Business plans at individual branches will create a discipline for managing limited resources in an optimum manner.

Preconditions

Adopt new Organizational Structure and Reporting Formats.

Summary Action Plan

Task	Responsibility	Time Frame
1. Using Standard Business Plan Format as shown in Appendix 13, develop branch and division level model.	DSEDN Management at branch and division levels	3Q2003
2. Implement writing of business plan on a scheduled basis.	DSEDN Management at branch and division levels	3Q2003

Results Expected:

1. Creation of a detailed business plan at the individual branches will create a focus on profitability.
2. Allow the district management to choose how to optimize limited investment funds and plan for future requirements.

10.7 Establish Scheduled Performance-Based Employee Reviews

Background of the Issue

Employees of DSEDN have higher salaries than the norm in Mongolia. With this higher salary, increased productivity and performance can be expected.

Preconditions:

Many problem issues within the company are outside the control of the managers and need to be taken into consideration when evaluating performance.

Summary Action Plan

Task	Responsibility	Time Frame
1. In conjunction with revision of the Organizational Chart, and revision of job descriptions, begin a “bottom-up” review of all employees.	Managers of DSEDN and Board of Directors	3Q2003
2. Consider where it is possible to combine responsibilities and downsize where necessary.	Managers of DSEDN and Board of Directors	3Q2003

Results Expected:

1. Elimination of unproductive employees, lowering of total salary costs with a reduction in staffing.
2. If done properly will result in increased motivation of employees.

10.8 Lower Overall Technical Losses

Background of the Issue

Accurate measurement of technical losses is difficult due to inaccurate metering, as many of the meters are of the older mechanical type. Without accurate determination of technical losses it is difficult to determine commercial losses.

Preconditions

Funding for replacement of meters.

Summary Action Plan

Task	Responsibility	Time Frame
1. Inventory and calibrate all existing meters, including those that connect directly to branches from the transmission network. Compare readings of these meters over monthly periods with totals obtained from transmission. Accurately correlate these two measured quantities.	Technical Deputy Director	1H2003 to 2005
2. Inventory and calibrate existing meters at the 0.4 kV level (see Task Install meters at all 0.4 kV levels), determine cost and schedule for installation of additional meters required. After all meters are in place and calibrated, determine technical losses from transmission to the 0.4 kV level.	Technical Deputy Director	1H2003 to 2005
3. Make estimates of losses from the 0.4 kV level to the consumer to be able to determine commercial loss percentages.	Technical Deputy Director	1H2003 to 2005

Results Expected:

1. Lowering of technical losses with phased reductions to a target acceptable level of 8% by end of 2005.
2. Plan for 18% by 1H2003, 16% by 2H2003, 14% 1H2004, 12% 2H2004
3. Target level of 8% would lower the purchase requirements of DSEDN to about 42 million KWhr annually, or a savings to DSEDN of almost 1.3 million Tg at the current wholesale price of electricity. In other words, each percent that technical loss is lowered results in a savings of about 90 million Tg. In the long view these savings can lower tariff requirements, and in the short term these funds can be used for necessary investments.

10.9 Install Meters at all 0.4 kV Transformers

Background of the Issue

Need to accurately measure commercial losses by bill writer area.

Preconditions

Required funding for purchase of meters.

Summary Action Plan

Task	Responsibility	Time Frame
1. Calibrate existing meters in place. Determine number of additional meters required and cost to purchase and install these meters.	Deputy Technical Director	1H2003
2. Calibrate existing meters in place. Determine number of additional meters required and cost to purchase and install these meters.	Deputy Technical Director	1H2003

Results Expected:

1. Ability to accurately determine commercial losses by region and by bill writer. This will allow focusing on the areas with the worst losses and increasing patrolling of the connections in that area.

10.10 Limit Commercial Losses to an Acceptable Level

Background of the Issue

There are high commercial losses due to illegal connections. Customers reconnect themselves after DSEDN enforces disconnection for non-payment. It is difficult with the present metering to determine actual commercial losses as separate from technical losses and accurately identify the region.

Preconditions

Law must be passed to make the theft of electricity a punishable crime, and this law must be enforced. Investment funding needs to be available. Secure meters need to be put in place. Accurate measurement of technical losses is necessary to determine actual commercial losses.

Summary Action Plan

Task	Responsibility	Time Frame
1. Installation of secure meters, beginning at all apartments and moving to the ger districts when practical. In conjunction with the metering to determine technical losses and the installation and calibration of meters at all 0.4 kV levels.	DSEDN Management, possibly Parliament, Bill Writers	Begin Immediately, goal by 4Q2004
2. With meters at all 0.4 kV levels it will be practical to identify the amount of commercial losses in each bill writers territory, and salaries of the bill writers can be adjusted according to the measured losses.	DSEDN Management, Bill Writers	Goal by 4Q2004
3. Improve patrolling to detect and remove illegal connections.	DSEDN Management, Bill Writers	Goal by 4Q2004

Results Expected:

1. Commercial losses are presently estimated at 9 million KWhr annually, or 3%. Lowering these losses to an "acceptable" level of 1% would result in an annual savings of almost 200 million Tg. Reaching this 1% level is not possible until accurate measurement of commercial losses is put in place. After accurate measurement is available, intermediate goals should be identified.

10.11 Recommendations for Implementation of “Life-Line” Tariffs

Background of the Issue

Many customers are very poor and a low use of electricity. Cost for metering and billing these customers individually is high relative to the return.

Preconditions

ERA would have to structure this tariff. Probably require government input.

Summary Action Plan

Task	Responsibility	Time Frame
1. Evaluate the potential financial effect of creation of a life-line tariff in cooperation with ERA. Determine if a life-line tariff is thought necessary, based on customer income and usage.	ERA, DSEDN Management	1H2003
2. Structure life-line tariff to be the same in all regions of Mongolia.	ERA, DSEDN Management	1H2003

Results Expected:

1. Would insulate individual poor customers from high costs for electricity as a percentage of their income. DSEDN could lower costs for supplying these customers because of lower billing and collection costs.

10.12 Improve Billing System

Background of the Issue

Present billing system is the same method used when electricity supply was an integrated state-owned enterprise. A computerized system was installed several years ago, which helped in tracking billing for customers. However, the present manual billing system has been little changed and is difficult to audit.

Other problems with the present billing system are:

- All amounts due from the customer are not shown on the bill left with the customer.
- Customers that do not have a current usage and billing are not billed the amount they have past due.
- Assessment of penalties for amounts past due is not consistently done.
- Amounts paid by customers are entered into the system as “current” or “paid for past due”, by the date of the bill the customer pays at the bank. Amounts received should be consistently applied to current usage.
- Customer data base inaccuracy

Preconditions

Improvement to the MIS staffing and equipment will be required.

Summary Action Plan

Task	Responsibility	Time Frame	
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10.12 Improve Billing System

<p>1. Put into operation a new billing system to include:</p> <ul style="list-style-type: none">• Implementing new paper bills that include past due amounts and their age with indicated penalties• Accurate aging of accounts receivable for each consumer• Scheduling of auditing of bill writer's and implementation of auditing method.• Billing of all customers that owe for current or past due electricity consumption.• Rotating of bill writers to different regions to eliminate potential collusion.• Upgrade MIS to allow electronic history of billing and collections.• Thoroughly review data base with updates and corrections where necessary.	Management at division and branch levels working with Bill Writers	1H2003	
<p><u>Results Expected:</u></p> <p>1. Will improve overall collections and tracking of commercial losses and limit possibility of collusion between customers and bill writers.</p>			

10.13 Enforce Disconnection Policy

Background of the Issue

Present policy for customer disconnection is not consistently applied.

Preconditions

There will be difficulty disconnecting some large customers due to economic impacts. Political will is required.

Summary Action Plan

Task	Responsibility	Time Frame
1. Review and edit disconnection policy where necessary. Inform customers of the policy, and disconnect according to policy adopted.	Board of Directors and Management of DSEDN	1H2003

Results Expected:

1. Will lower accounts receivable.
2. There could be an issue of functional elimination of client base which has long-term deleterious effects.

10.14 Collect Accounts Receivable from Entities

Background of the Issue

Accounts receivable from the Entities is a high percentage (about 50%) of the total accounts receivable.

Preconditions

Many of the entities are either totally or functionally bankrupt. Some of the entities are protected against disconnections by levels of the government and the Board of Directors.

Summary Action Plan

Task	Responsibility	Time Frame
1. Institute a program to collect for all current billing and to assess penalties for non-payment of billing from a beginning date. Actively determine how to restructure existing accounts receivable at the entities and write-off bad debt where necessary.	Board of Directors, Director of DSEDN, State Property Committee	Begin Immediately, recover, arrange for payment or write off as bad debt by the 1Q2004

Results Expected:

1. Collection of a percentages of the past due amounts will be a source for investments within the company. Total past due from the entities totals almost 2 billion Tg and over half of this past due is from the local cement plant. Recovering this past due will bring much a much needed source of funding to DSEDN.

10.15 Collect Accounts Receivable from Budget Customers

Background of the Issue

Government or Budget customers amount to a small but significant portion of the accounts receivable. These funds should be identified and arrangements made for full payment. Current billing must be paid when due.

Preconditions

Commitment of several levels of the government.

Summary Action Plan

Task	Responsibility	Time Frame
1. Pressure given to respective levels of the government to pay the amounts due to DSEDN. Public should be made aware of the problem.	Board of Directors, Director of DSEDN, State Property Committee	Begin Immediately, recover, arrange for payment or write off as bad debt by the 1H2003

Results Expected:

1. Full collection of the accounts receivable will bring in almost 260 million Tg.

10.16 Collect Accounts Receivable from Residential Customers

Background of the Issue

Residential customers do not see the importance of paying for electricity on a timely basis.

Preconditions

Availability of staffing.

Summary Action Plan

Task	Responsibility	Time Frame
1. Begin public relations program to educate individual consumers on the ramifications of non-payment; i.e. effects on tariffs, problems of maintaining reliability due to lack of investment funds.	Board of Directors, Director of DSEDN, State Property Committee	Begin Immediately, recover, arrange for payment or write off as bad debt by the 1Q2004
2. Actively determine what accounts are collectable and what amounts should be planned to be written off as bad debt.		
3. Inform all customers of disconnection procedures and enforce the procedure. Require deposit for reconnection.		

Results Expected:

1. 50% collection of accounts receivable from residential customers will bring in about 750 million Tg.

10.17 Write off of Bad Debt

Background of the Issue

Misconception of how write off is handled on the expense/balance sheet.

Preconditions

Change in the law that requires court approval before debt can be written off.
Debt between individual entities within the sector is endemic.
Recommendations made at the government level for addressing this debt have not been implemented.

Summary Action Plan

Task	Responsibility	Time Frame
<p>1. All truly bad debt should be written off, and an allowance for potential bad debt shown in the financial statements. Additional the ERA should give an allowance for bad debt in the regulated tariff. There is a misconception that writing off of bad debt affects more than the balance sheet. Under International Accounting Standards IAS 18:</p> <p>“If revenue has been recognized but collectibility of a portion of the amount is doubtful, bad debt expense should be recognized when the revenue is recognized.”</p>	Director of DSEDN, and Potentially State Property Committee	Begin Immediately, recover, arrange for payment or write off as bad debt by the 1Q2004

Results Expected:

1. Realization of actual bad debts, and more accurate representation of accounts receivable on the company's balance sheet.

Many of these recommendations will require an extended period of time to accomplish, and DSEDN will need some assistance to accomplish the tasks. After consultation with DSEDN to determine the highest priority tasks and where assistance would be helpful, it is recommended that USAID consider utilizing some of the existing technical assistance funding to assist DSEDN in the tasks. A summary of the tasks and timeline is given below:

Figure 10-1 Task Summary and Timeline

	2002	2003				2004			
	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
1 Restructuring of the Board of Directors	=====	=====	=====>						
2 Restructuring of the Organizational Chart		=====>							
3 MIS Implementation		=====	=====	=====>					
4 Standardization of Reporting Formats to Upper Management		=====	=====	=====>					
5 Investment Decisions Based on Financial Return	=====	=====	=====	=====	=====	=====	=====	=====	=====>
6 Creation of Focussed Business Plan at Each Branch and at the District Level		=====	=====	=====>					
7 Establish Scheduled Performance-Based Employee Reviews		=====	=====	=====>					
8 Lower Overall Technical Losses	=====	=====	=18%	=====	=16%	=====	=14%	=====	=12%
9 Install Meters at all 0.4 kV Transformers		=====	=====>						
10 Limit Commercial Losses to an Acceptable Level		=====	=====	=====	=====	=====	=====	=====	=====>
11 Recommendations for Implementation of Life-Line Tariffs		=====	=====>						
12 Improve Billing System		=====	=====>						
13 Enforce Disconnection Policy		=====	=====>						
14 Collect Accounts Receivable from Entities			=====	=====	=====>				
15 Collect Accounts Receivable from Budget Customers			=====>						
16 Collect Accounts Receivable from Residential Customers			=====	=====	=====>				
17 Write off of Bad Debt		=====	=====	=====	=====>				

11 Funding Sources

Many of these recommendations require funding as a fundamental precondition. There are many potential sources for this funding, and all of them require the Board of Directors and upper management of DSEDN to be highly proactive towards searching for and obtaining this funding.

The most immediate and lowest cost source of funding for DSEDN is collection of accounts receivable, and this should be the highest and first priority. The lowering of technical and commercial losses is also of high priority, as savings from lower system losses can be used for investments. Next in priority would be grant funding followed by donor, private sources, and then concessionary funding from equipment manufacturers.

The first necessary step prior to obtaining any funding for any investment is to create a cost-benefit analysis for that investment. This analysis will allow management to prioritize investments and to show potential sources of borrowed capital the ability to pay back loans.

Limited funding is available in the short term and these funds need to be utilized where the benefit is highest. The advantage of higher return investments is also that the affect on the tariff requirements is minimized, since returns to pay off the loan are forthcoming early.

Funding for more accurate and secure meters will most likely have the highest potential return, at least initially. The large savings from lowering technical and commercial losses can be used to pay back the required funds, probably with no affect on the present tariff. Any improvement in technical and commercial losses directly affects income of the company.

Access to capital can be from many sources. These include donor funds from World Bank loans, and other agencies. The Aimag Center Power Distribution System Rehabilitation, Phase 2 portion of the World Bank Aimag Loan Component has \$3.2 million dollars for these types of investments.

Some grant funding could be available, particularly when it is shown that a high return will result. Donors funds and grant money is the cheapest capital available and should be aggressively pursued.

To help in obtaining donor funding, there is the option for the Government of Mongolia to service the debt until financial results from the investment are realized. The Government of Mongolia could also give sovereign guarantees for loans.

Active negotiation and discussions should begin with banks such as the Ag Bank and Trade and Development bank focussed on how to obtain the required investment funds. If there are obstacles for obtaining this type of private capital, then active lobbying must be made. As an example, the law

on collateral does not seem to be strong enough to secure loans (according to discussions with the banks). Having a strong collateral law in place could assist utility companies in finding required funding.

Possibly the only viable source of financing using domestic resources is for the Government of Mongolia to backstop (guarantee payment) on loans from commercial banks to DSEDN. The Government would not be providing funds, but would be guaranteeing repayment in the event of default.

For obtaining some assets, such as computers for improving MIS, a lease or perhaps a lease/own option is a potential option. MIS is of critical importance in improving reporting as well as billing and collections, so there should be a strong focus on improving MIS with the installation of the right equipment quickly.

Equipment manufactures, such as meter manufactures may finance the purchase of their equipment, possibly in conjunction with donor financing. It is to the advantage of these equipment manufacturers to become the “standard” in a country such as Mongolia and this advantage should be actively pursued.

An alternative could be to lease portions of the operation to companies that have the necessary investment capital, under a Lease Operate Maintain (LOM) type of contract with a limited time scope. Contract meter reading is common in many countries, and the contract could contain such issues as bonuses for accuracy and number of meters read.

12 Recommendation Priorities and Further Technical Assistance

12.1 Priorities

Table 12.1 lists the recommendations given in this report and the priority of these recommendations. It must be noted that there has not been an opportunity to discuss these recommendations and priorities with the management of DSEDN. Prior to, or part of, further technical assistance, discussion and agreement with the recommendations and acceptance of the prioritization needs to be done.

Table 12-1 Recommendations for DSEDN Commercialization Efforts

	Recommendation	Priority
1	Restructuring of the Board of Directors	Medium
2	Restructuring of the Organizational Chart	Medium
3	MIS Implementation	High
4	Standardization of Reporting Formats to Upper Management	High
5	Investment Decisions Based on Financial Return	High
6	Creation of Focused Business Plan at Each Branch and at the District Level	Medium

7	Establish Scheduled Performance-Based Employee Reviews	Medium
8	Lower Overall Technical Losses	High
9	Install Meters at all 0.4 kV Transformers	High
10	Limit Commercial Losses to an Acceptable Level	High
11	Recommendations for Implementation of Life-Line Tariffs	Low
12	Improve Billing System	High
13	Enforce Disconnection Policy	Medium
14	Collect Accounts Receivable from Entities	High
15	Collect Accounts Receivable from Budget Customers	High
16	Collect Accounts Receivable from Residential Customers	High
17	Write off of Bad Debt	Medium

The highest priority for DSEDN is recommendations 14 through 16; collect accounts receivable. As discussed in the report and in the recommendations section, there are sector and political obstacles to collecting these funds that must be addressed.

Many of these recommendations are interrelated, implementation of MIS will allow more accurate management decision-making, and should be done in conjunction with improvements in the billing system.

Also of high importance is the lowering of technical and commercial losses. Serious efforts must be undertaken to first identify and accurately measure these losses and then determine how to minimize the losses.

12.2 Technical Assistance

Discussion with the counterparts will be necessary to accurately determine the most effective and efficient utilization of further technical assistance. However, there are several areas where the consultants could facilitate progress. These include:

- MIS Implementation;
- Improvement in the Billing System;
- Financial analysis for planned investments;
- Help find and analysis external funding sources, and
- Assist in communication with government agencies such as the ERA and the SPC to help eliminate sector obstacles to commercialization.

Possible future technical assistance to be given to DSEDN is outlined below.

MIS Implementation

1. Assistance in selection of MIS manager;
2. Help in evaluating Hardware and Software requirements, and
3. Determine report requirements and format.

Billing System Improvement

1. Analysis of options for improving handling of bills internally;
2. Help in determining costs for implementing improved billing system, and
3. Assist MIS manager in coordinating with IT implementation.

Financial Analysis

1. Assist Financial and Technical Deputy Directors in prioritizing investments, and
2. Develop standard procedures for analysis of investments.

Funding Sources

1. Work with Executive Director and Financial Deputy Director to find optimum sources of financing, and
2. Assist in tariff implications of funding alternatives.

Government Communication Efforts

1. Detail sector related obstacles to the commercialization efforts as seen by the management of DSEDN, and
2. Communicate these issues to the GOM.